22BCU519N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Fifth Semester)

Branch - **BIOCHEMISTRY**

TISSUE CULTURE AND BIOTECHNOLOGY

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	What pH range is generally maintained for plant tissue culture media? A) 3.0 - 4.0 B) 5.5 - 6.0 C) 7.0 - 8.0 D) 9.0 - 10.0	K1	CO1
	2	During somatic embryogenesis, which stage comes immediately after the globular stage? A) Cotyledonary stage B) Heart-shaped stage C) Torpedo stage D) Zygotic stage	K2	CO1
2	3	Which gene is commonly used to confer insect resistance in genetically modified plants? A) EPSPS gene B) Bt (Bacillus thuringiensis) gene C) GFP (Green Fluorescent Protein) gene D) NPTII gene	K1	CO1
	4	Which of the following diseases is caused by a Gemini virus? A) Tomato yellow leaf curl disease B) Tobacco mosaic disease C) Late blight of potato D) Rust disease in wheat	K2	CO1
3	5	Which of the following is a commonly used basal medium in animal cell culture? A) Murashige and Skoog (MS) medium B) Nutrient Agar C) Dulbecco's Modified Eagle Medium (DMEM) D) Sabouraud Dextrose Agar	K1	CO1
	6	HeLa cells are an example of: A) Bacterial culture B) Primary cell line C) Continuous cell line D) Plant tissue culture	K2	CO1
4	7	Interferons produced by recombinant DNA technology are used primarily for: A) Treating bacterial infections B) Enhancing plant growth C) Digesting proteins in the stomach D) Treating viral infections	K1	CO2
	8	Which feature makes monoclonal antibodies highly specific in their action? A) Their large size B) Their ability to bind to a single specific antigen C) Their high temperature resistance D) Their ability to cross the blood-brain barrier easily	K2	CO2
5	9	Cystic Fibrosis is caused by mutations in which gene? A) CFTR B) BRCA1 C) TP53 D) Hemoglobin beta	K1	CO3
	10	What is the main goal of antisense technology? A) To enhance protein synthesis B) To inhibit the expression of a specific gene C) To mutate DNA sequences D) To increase DNA replication	K2	CO3

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the process of micropropagation and mention one advantage of using it in plant breeding.	K2	CO1
		(OR)		
	11.b.	Illustrate the process of androgenesis in plant tissue culture, mentioning key steps involved.		
2	12.a.	Identify the key features of the Cauliflower Mosaic Virus vector and analyze its advantages and limitations.	K3	CO1
		(OR)		
	12.b.	Utilize the understanding of gene transfer techniques and compare the efficiency of electroporation and biolistic methods in plant cells.		
3	13.a.	Interpret the distinguishing features of primary culture in animal cell culture.	K3	CO1
		(OR)		
	13.b.	Organize the distinguishing features of finite and continuous cell lines in a comparative table.		
4	14.a.	Analyze the steps involved in the recombinant production of TPA and discuss its clinical use.	K4	CO2
		(OR)		
	14.b.	Detail the process of producing a recombinant Vaccinia virus vaccine and discuss its application.		
5	15.a.	Examine the use of viral vectors in gene therapy and evaluate their advantages and risks in clinical applications.	K4	CO3
		(OR)		
	15.b.	Summarize the salient features of the Human Genome Project and explain how they contributed to biotechnology.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Examine the steps involved in the isolation and culture of protoplasts and discuss their relative efficiencies.	K4	CO1
2	17	Analyze how Agrobacterium tumefaciens naturally transfers T-DNA into plant cells and explain how this mechanism is utilized in plant genetic engineering.	K4	CO1
3	18	Classify the different types of culture media used for maintaining various animal cell lines based on their nutrient requirements.	K4	CO1
4	19	List the major steps involved in the production of monoclonal antibodies using hybridoma technology.	K4	CO2
5	20	Analyze the process of nuclear transfer and explain how it is used in cloning animals.	K4	CO3

Z-Z-Z END